In the Claims:

1-29. Canceled

46-62. Canceled

REMARKS - OBJECTIONS TO THE DRAWINGS

The examiner stated that the drawings must show "a thermal energy source" as claimed in Claim 30, or that this feature must canceled from the claim. In response, the applicant respectfully submits that the thermal energy source is depicted as item 16 in FIGUREs 1-5. The description of this filament as a thermal energy source is further found in the specification, wherein "filament 16 of coated light bulb 10 is additionally a heat source, elevating the temperature of rare earth thin film 12." (Page 19, Lines 24-25) Therefore the applicant respectfully requests that the examiners objection to the depiction of a thermal energy source in the drawings be withdrawn.

CONCLUSION

In view of all the foregoing, claims 30-45 herein are in form and condition for allowance. Issue of a Notice of Allowance therefore is respectfully requested.

The Commissioner is hereby authorized to charge any fees or credit any overpayments to Deposit Account No. 50-0860 of Advanced Technology Materials, Inc.

Respectfully submitted,

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APPENDIX A

Version with Markings to Show Changes Made

In the Claims:

1.-29 Canceled.

30. A hydrogen gas detector, comprising

a light source;

a thermal energy source; different from light source

an optical filter having an optical transmissivity responsive to the presence and concentration of hydrogen gas in an ambient environment to which the optical filter is exposed, said optical filter being disposed in proximity to the light source such that said optical filter is illuminated with light from the light source, and being operatively coupled to the thermal source such that the optical filter is heated by the thermal source;

a light detector generating an output signal, the state of said output signal being proportional to the intensity of light impinging on the light detector, said light detector being disposed in light-sensing relationship to the optical filter, whereby light from the light source passing through the optical filter impinges on the light detector and generates said output signal as a indication of the presence and/or concentration of hydrogen gas in the ambient environment.

31. The hydrogen gas detector of claim 30, wherein the light source comprises a light-generating element selected from the group consisting of incandescent bulbs, light emitting diodes, fluorescent lamps, electroluminescent lamps, and optical lasers, and optical waveguides illuminated by any such light-generating element.

32. The hydrogen gas detector of claim 30, wherein the thermal energy source comprises a heat-generating element selected from the group consisting of incandescent bulbs, resistive wires, exothermic chemical reactions, ultrasonic radiation, acoustic radiation, microwave radiation, and laser radiation.

33. The hydrogen gas detector of claim 30, wherein the light source and the thermal energy source comprise a same element.

34. The hydrogen gas detector of claim 30, wherein light source and the thermal energy source comprise different elements.

35. The hydrogen gas detector of claim 30, wherein the light detector comprises a light detection element selected from the group consisting of photodiodes, avalanche photodiodes, phototubes, photomultiplier tubes, microchannel plates, solar cells, image intensifiers, photoconductor detectors, charge-coupled devices, and combinations or arrays thereof.

36. The hydrogen gas detector of claim 30, wherein the optical filter comprises a rare earth metal thin film deposited on an optical output surface of the light source.

37. The hydrogen gas detector of claim 36, wherein the rare earth metal thin film comprises a rare earth metal component selected from the group consisting of trivalent rare earth metals reactive with hydrogen to form both metal dihydride and metal trihydride reaction products, wherein the metal dihydride and metal trihydride reaction products have differing optical transmissivity.

38. The hydrogen gas detector of claim 36, wherein the rare earth metal thin film comprises at least one metal selected from the group consisting of:

(I) scandium, yttrium, lanthanum, cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium, actinium, thorium, protactinium, uranium, neptunium, plutonium, americium, curium, berkelium, californium, einsteinium, fermium, mendelevium, nobelium, and lawrencium,

(II) alloys thereof, and

(III) alloys containing one or more of such metals alloyed with an alloying component selected from the group consisting of magnesium, calcium, barium, strontium, cobalt and iridium.

39. The hydrogen gas detector of claim 36, wherein the rare earth metal thin film comprises yttrium.

40. The hydrogen gas detector of claim 36, wherein the rare earth metal thin film is overlaid by a hydrogen-permeable material comprising a metal selected from the group consisting of Pd, Pt, Ir, Ag, Au, Ni, Co, and alloys thereof.

41. The hydrogen gas detector of claim 36, wherein the rare earth metal thin film is overlaid in sections by a plurality of hydrogen-permeable material, each comprising a metal selected from the group consisting of Pd, Pt, Ir, Ag, Au, Ni, Co, and alloys thereof, wherein each overlay section exhibits a unique permeability to hydrogen.

42. The hydrogen gas detector of claim 36, wherein the rare earth metal thin film is overlaid by a hydrogen-permeable material that is doped with a dopant selected from the group consisting of Mg, Ca, Al, Ir, Ni and Co.

43. The hydrogen gas detector of claim 36, wherein the rare earth metal thin film is overlaid in sections by a plurality of hydrogen-permeable materials, each of which is doped with a dopant selected from the group consisting of Mg, Ca, Al, Ir, Ni and Co, wherein each overlay section exhibits a unique permeability to hydrogen.

44. The hydrogen gas detector of claim 36, wherein the rare earth metal thin film is overlaid by a thin film of a material including a metal selected from the group consisting of palladium, platinum, and iridium.

45. A hydrogen detection system for monitoring an extended or remote area region for the incursion or generation of hydrogen therein, said hydrogen detection system comprising a multiplicity of hydrogen gas detectors as in claim 30, each of which is arranged for exposure to a specific individual locus of the extended area region.

46. –62. Canceled